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Parenti

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(54) **FENCE POST WITH METAL INSERT**

(71) Applicant: **Steven Joseph Parenti**, Lodi, CA (US)

(72) Inventor: **Steven Joseph Parenti**, Lodi, CA (US)

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E04H 12/22 (2006.01)

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,158,291	A *	5/1939	Lank	F16B 12/14 191/64
3,200,554	A *	8/1965	Goodman	A47B 91/00 362/431
4,175,883	A *	11/1979	Lemelson	A01G 17/14 256/65.11
5,735,310	A	4/1998	Hipshire	256/66
5,862,642	A	1/1999	Erwin	52/736.3
6,173,945	B1	1/2001	Lindsey et al.	256/24
6,530,561	B2	3/2003	Larsen et al.	256/24
6,840,507	B2	1/2005	Brown	256/65.01
7,571,897	B2	8/2009	Heinz	256/65.03
7,971,412	B1 *	7/2011	Lim	E04F 11/1814 52/298
8,117,798	B2 *	2/2012	Bergman	E04H 12/2253 256/65.14
8,505,880	B2	8/2013	Langenwalter	256/65.12
9,976,298	B2 *	5/2018	Bergman	E04B 1/486

(Continued)

OTHER PUBLICATIONS

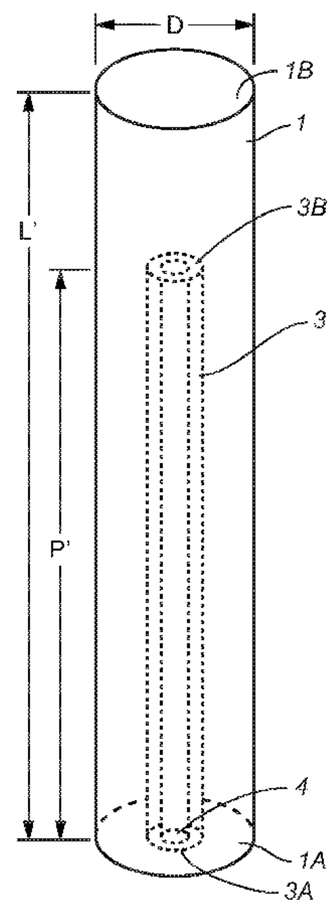
Home-Dzine article, entitled "Easy garden fence" (downloaded from http://www.home-dzine.co.za/diy/diy-easy-fence.htm on Aug. 8, 2017), 3 pages.

Primary Examiner — Daniel J Wiley
(74) *Attorney, Agent, or Firm* — Alfred A. Equitz

(57) **ABSTRACT**

A fence post assembly including a wood post member (having a longitudinal axis, a first end surface, and a second end surface) and an elongated metal insert (having an insert longitudinal axis, a first end surface, and a second end surface), where the metal insert is positioned within the wood post member, with the first end surface of the metal insert at least substantially aligned with the first end surface of the wood post member, and the insert longitudinal axis at least substantially aligned with the longitudinal axis of the wood post member. Typically, the metal insert is longitudinally shorter than the wood post member so that the metal insert does not extend into an end portion of the fence post assembly, allowing the end portion to be conveniently trimmed off or otherwise processed, e.g., during or after installation. Other aspects are methods for manufacturing or installing any embodiment of the fence post assembly.

17 Claims, 2 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

2005/0252124	A1*	11/2005	Bergman	E04H 12/2253 52/296
2012/0131879	A1*	5/2012	Bergman	E04F 11/1812 52/704
2017/0175384	A1*	6/2017	Bergman	E04B 1/486

* cited by examiner

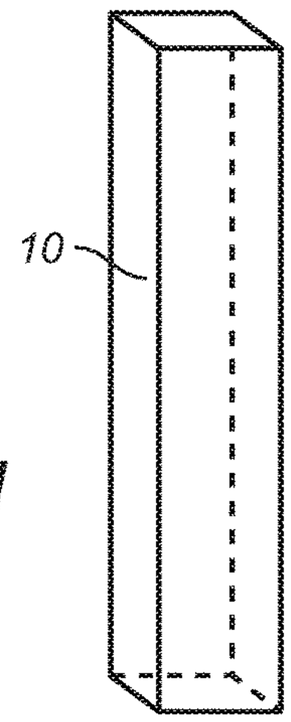


FIG. 1

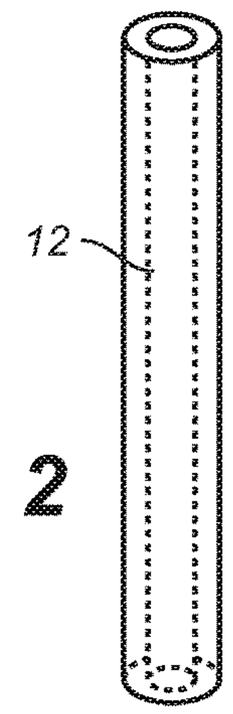


FIG. 2

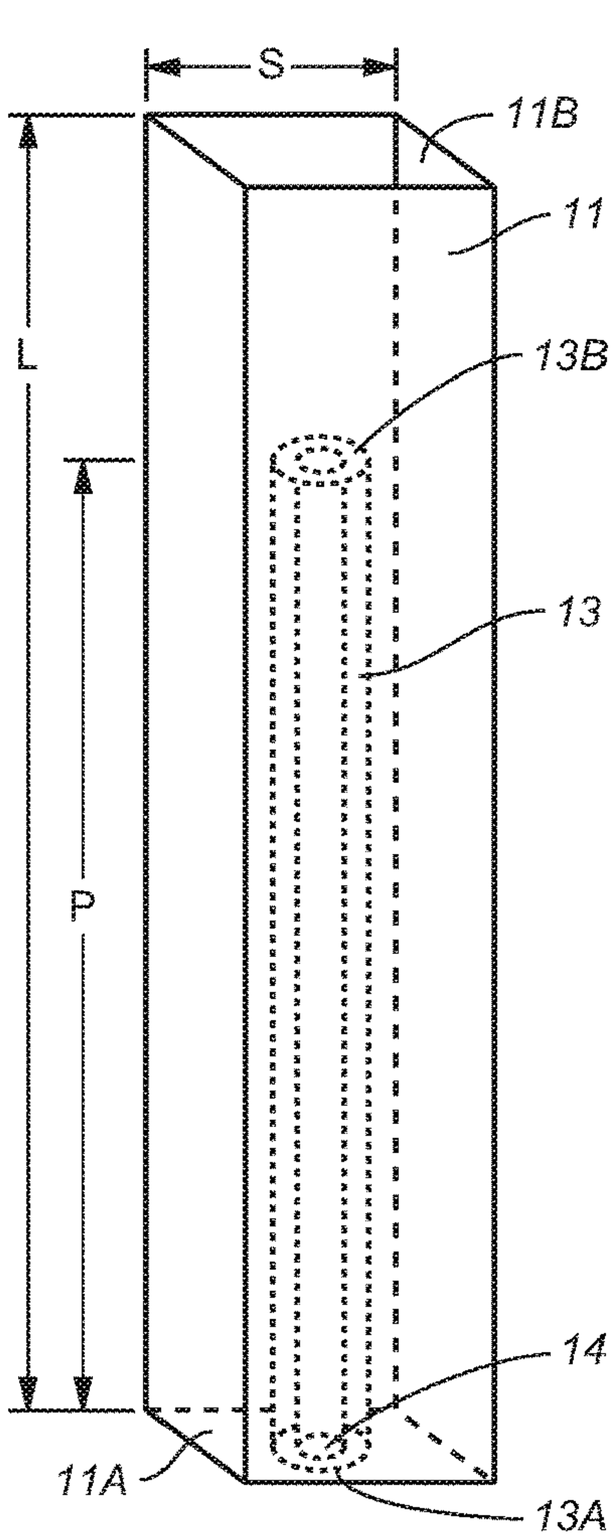


FIG. 3

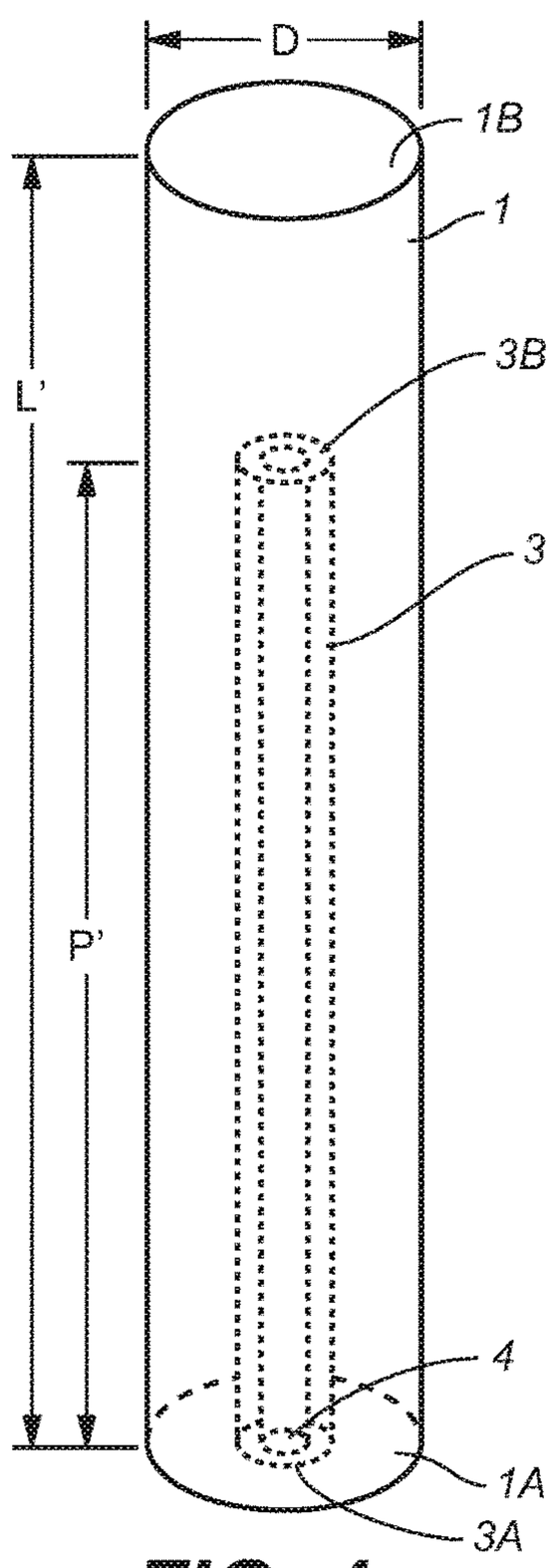


FIG. 4

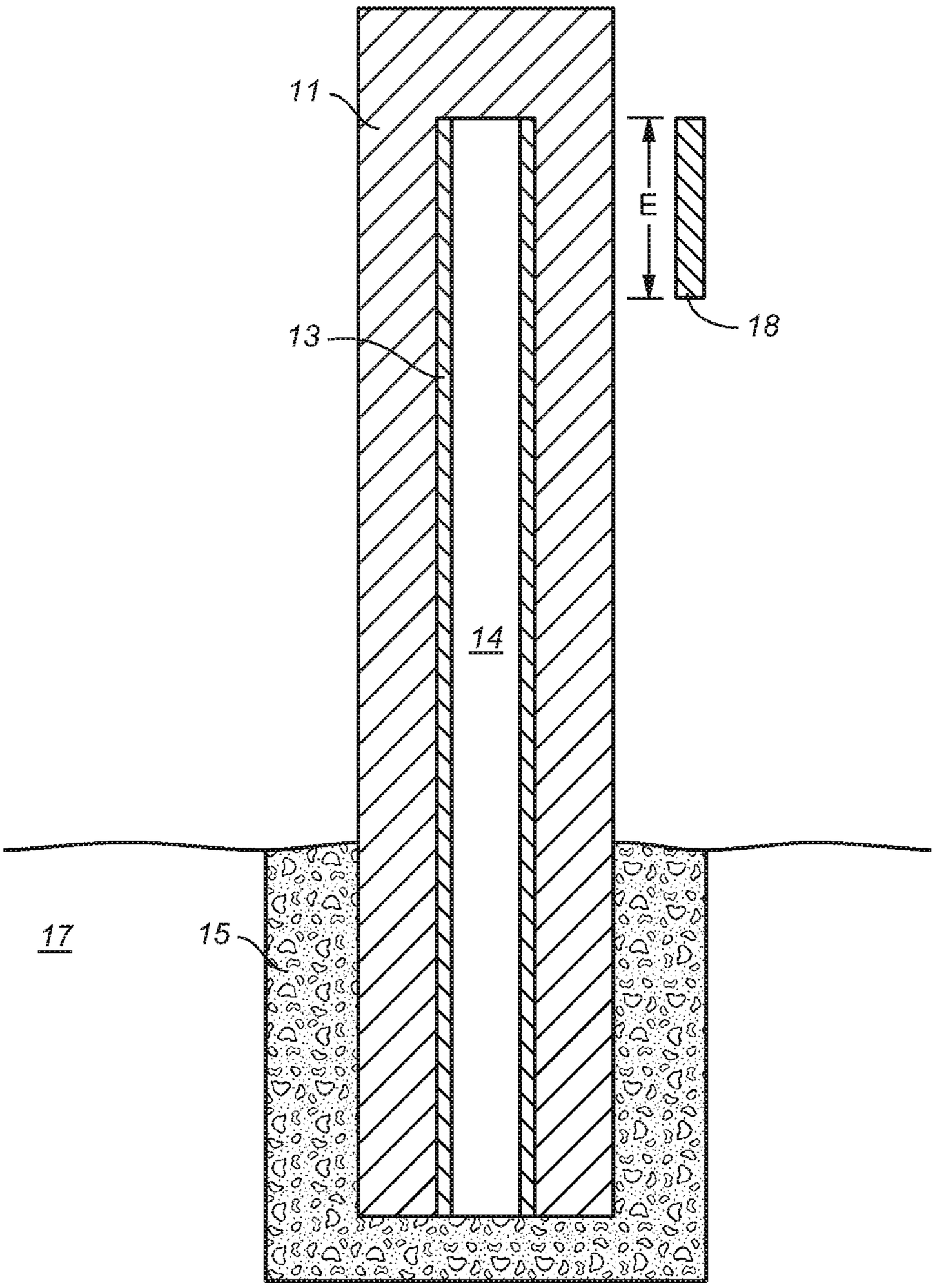


FIG. 5

FENCE POST WITH METAL INSERT

TECHNICAL FIELD

The invention pertains to a fence post assembly which includes a metal insert in a wood post member, a method for manufacturing the post assembly, and a method for installing the post assembly.

BACKGROUND

Throughout this disclosure including in the claims, the term "wood" is used as a noun to denote the hard, fibrous substance which composes most of the stem and branches of a tree or shrub, and as an adjective to denote "made of wood" or "wooden."

Throughout this disclosure including in the claims, the expression that an object (e.g., a metal insert) is an "elongated" object denotes that the object has a longitudinal axis and has substantially greater (typically, much greater) size (length) along the longitudinal axis than along any direction perpendicular to the longitudinal axis.

Fence posts made of wood, plastic, or metal are conventionally used as elements of fences. It is also known to use a fence post assembly, including a plurality of elements assembled together (typically by a user as a step of fence installation), in place of a fence post (e.g., a fence post made of wood).

A typical wood fence post has a number of desirable attributes, including that it is easy to install (e.g., using simple, conventional fence installation methods) and inexpensive. However, a wood fence post (when it has been installed as an element of a typical fence) is typically subject to rotting or other deterioration, mainly due to chemical reaction of the fence post wood with dirt and water to which it is exposed (and other environmental factors). The deterioration typically causes the post to lose strength (and/or to warp) over time after installation, until the amount of strength loss and/or warping become unacceptable in the sense that the post needs to be replaced or reinforced.

Typical installation of a conventional wood fence post includes a step of anchoring the post in concrete, followed by attachment of other fence structure (e.g., fence rails) to the anchored post. The portion of the installed post above the concrete anchor is subject to the earliest and most rapid rotting and/or other deterioration, due to interaction of exposed wood with soil and water and other environmental factors.

One conventional method for reinforcing an installed, deteriorated conventional wooden post is to pound a reinforcing part (e.g., a metal part) into the earth (or into concrete or the like which anchors the post) and against the post until the part is positioned to support the deteriorated post.

The inventor of the present invention has recognized that there is a need for a substitute for a conventional wood fence post, where the substitute is designed and structured so as not to be subject to unacceptable loss of strength (and/or unacceptable warping) due to rotting or other deterioration after installation (or to have a substantially longer expected useful life after installation than does a conventional wood post, before becoming subject to unacceptable strength loss and/or warping due to deterioration). The inventor has also recognized that such a substitute is desirably a pre-assembled, simple structure (not requiring assembly by the user before or during installation) which is ready for easy installation by the user (e.g., installation in the same manner as conventionally employed to install a conventional wood fence post), and is preferably inexpensive to manufacture (relative to more complex fence post structures and fence post structures including more expensive materials).

Some conventional fence post equipment undesirably requires user assembly before or during installation. For example, one such conventional product includes a metal frame and wooden cladding which must be bolted or otherwise fastened to the frame by the user during installation.

BRIEF DESCRIPTION OF THE INVENTION

In a class of embodiments, the invention is a fence post assembly including a wood post member (having a longitudinal axis, a first end surface, and a second end surface) and an elongated metal insert (having an insert longitudinal axis, a first end surface, and a second end surface), wherein the metal insert is positioned within the wood post member, with the first end surface of the metal insert at least substantially aligned with the first end surface of the wood post member, and the insert longitudinal axis at least substantially aligned with the longitudinal axis of the wood post member. Typically, the metal insert is a metal pipe having an annular cross-section (in planes perpendicular to the insert longitudinal axis). Typically, the metal insert is longitudinally shorter than the wood post member (the distance between the first end surface and second end surface of the metal insert is less than the distance between the first end surface and second end surface of the wood post member), so that the metal insert does not extend into an end portion of the fence post assembly (i.e., an end portion including the second end surface of the wood post member). This allows the end portion of the fence post assembly to be conveniently trimmed off (or otherwise processed), e.g., during or after installation of the fence post assembly.

In a class of embodiments, the invention is a method for manufacturing a fence post assembly, including steps of: removing wood from a first end of a solid wood piece having a longitudinal axis, a first end surface, and a second end surface (e.g., by drilling into the first end surface of the wood piece), thereby producing a wood post member having a cavity defined therein, said wood post member having the longitudinal axis, a cored first end surface, and the second end surface (preferably, this is the only step of removing wood from the solid wood piece or wood post member, so that preferably no additional cavity is formed therein); and ramming an elongated metal insert, having an insert longitudinal axis, a first end surface, and a second end surface, into the cavity defined in the wood post member, such that the insert is held by friction within the wood post member with the first end surface of the metal insert at least substantially aligned with the cored first end surface of the wood post member, and the insert longitudinal axis at least substantially aligned with the longitudinal axis of the wood post member.

Benefits of typical embodiments of the inventive fence post assembly include all or some of the following:

the fence post assembly is structured so as not to be subject to unacceptable loss of strength (and/or unacceptable warping) due to deterioration (e.g., rotting) after installation, and/or to have a substantially longer expected useful life than does an installed conventional (i.e., solid) wood fence post before becoming subject to unacceptable strength loss and/or unacceptable warping due to deterioration. Thus, the inventive fence post assembly typically do not need to be

replaced or repaired after installation, and/or have a substantially longer useful life than a typical installed conventional wood fence post;

the fence post assembly is a pre-assembled structure (not requiring assembly by the user during or before installation) which is ready for easy installation by the user. Thus, a typical embodiment of the inventive fence post assembly is pre-assembled and ready for installation in the same manner as conventionally employed to install a conventional (purely wooden) wood post;

the fence post assembly has a simple structure and is inexpensive (relative to more complex fence post structures and/or fence post structures including more expensive materials); and the fence post assembly is easily installable and usable, e.g., using conventional methods for installing a conventional (purely wooden) fence post, and conventional methods for constructing a fence which includes a conventionally installed wooden fence post, without the need for extra parts (e.g., brackets) as are required for installation of some conventional fence post assemblies which include metal and/or plastic components.

Other aspects of the invention are methods for manufacturing any embodiment of the inventive fence post assembly, and methods for installing any embodiment of the inventive fence post assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a wood post which may be used to manufacture an embodiment of the inventive fence post assembly.

FIG. **2** is a perspective view of an elongated metal pipe which may be used to manufacture an embodiment of the inventive fence post assembly.

FIG. **3** is perspective view of an embodiment of the inventive fence post assembly, which includes an annular metal insert (shown in phantom view) in a wood post member having a square outer periphery.

FIG. **4** is perspective view of an embodiment of the inventive fence post assembly, which includes an annular metal insert (shown in phantom view) in a wood post member having a circular outer periphery.

FIG. **5** is a side cross-sectional view of the FIG. **3** embodiment of the inventive fence post assembly, installed in a concrete anchor in the earth.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Embodiments of the inventive fence post assembly will be described with reference to FIGS. **1-5**.

In a class of embodiments, the inventive fence post assembly includes a wood post member (having a longitudinal axis, a first end surface, and a second end surface) and an elongated metal insert (having a longitudinal axis, to be referred to herein as an insert longitudinal axis, a first end surface, and a second end surface), wherein the metal insert is positioned within the wood post member, with the first end surface of the metal insert at least substantially aligned with the first end surface of the wood post member, and the insert longitudinal axis at least substantially aligned with the longitudinal axis of the wood post member. The metal insert is positioned "within" the wood post member in the sense that at least a major portion of the metal insert (sufficient to provide structural support to the wood post member) is within the wood post member. Typically, the metal insert is positioned entirely within the wood post member, either with the entire metal insert recessed (e.g., by less than an inch or a half inch) within the wood post member, or so that the first end surface of the metal insert is exactly (or as precisely as practical) aligned with the first end surface of the wood post member. However, in some embodiments of the assembly in which the first end surface of the metal insert is substantially, but not exactly, aligned with the first end surface of the wood post member, an end portion (e.g., an end portion of length less than an inch or a half inch) of the metal insert may protrude out from the first end surface of the wood post member.

Preferably, the fence post assembly is manufactured so that the first end surface of the metal insert of the assembly is aligned with the first end surface of the wood post member as precisely as is practical. For example, a ram (e.g., a hydraulic ram) may be used to pound the metal insert into a cavity in the wood post member (e.g., the cavity having been predefined by drilling into a post to define the cavity so that said cavity is sized and shaped for receiving the metal insert), with the ram having a distal end (which contacts the metal insert) which is sized, shaped, and positioned to contact a portion of the first end surface of the wood post member when the metal insert has advanced just far enough into the cavity so that the first end surface of the metal insert of the assembly is aligned with the first end surface of the wood post member. In the example, after the ramming step, the first end surface of the metal insert of the assembly is aligned with the first end surface of the wood post member to within tolerances of the ram and its method of operation.

For example, the embodiment of the inventive fence post assembly shown in FIG. **3** includes elongated wood post member **11** (having first end surface **11**A, second end surface **11**B, a longitudinal axis perpendicular to surfaces **11**A and **11**B, and length L along the longitudinal axis), and the embodiment of the inventive fence post assembly shown in FIG. **4** includes elongated wood post member **1** (having first end surface **1**A, second end surface **1**B, a longitudinal axis perpendicular to surfaces **1**A and **1**B, and length L' along the longitudinal axis).

The FIG. **3** embodiment also includes elongated metal insert **13** (shown in phantom view) positioned within member **11**. Insert **13** has an annular first end surface **13**A, an annular second end surface **13**B, a longitudinal axis perpendicular to surfaces **13**A and **13**B, and length P along the longitudinal axis.

The FIG. **4** embodiment also includes elongated metal insert **3** (shown in phantom view) positioned within member **3**. Insert **3** has an annular first end surface **3**A, an annular second end surface **3**B, a longitudinal axis perpendicular to surfaces **3**A and **3**B, and length P' along the longitudinal axis.

Metal insert **13** of FIG. **3** is positioned within wood post member **11** (in longitudinally elongated cavity **14** which has been drilled into member **11**), with end surface **13**A aligned with end surface **11**A of member **11**. In variations on the FIG. **3** embodiment, metal insert **13** is positioned within post member **11** (in cavity **14**) with end surface **13**A substantially aligned (but not exactly aligned) with end surface **11**A of member **11**, either:

so that surface **13**A protrudes (longitudinally out from member **11**) slightly beyond surface **11**A; or

so that insert **13** is entirely within cavity **14**, with a bottom end portion of member **11** extending longitudinally slightly beyond surface **13**A.

Similarly, metal insert **3** of FIG. **4** is positioned within wood post member **1** (in longitudinally elongated cavity **4** which has been drilled into member **1**), with end surface **3**A

aligned with end surface **1**A of member **1**. In variations on the FIG. **4** embodiment, metal insert **3** is positioned within post member **1** (in cavity **4**) with end surface **3**A substantially aligned (but not exactly aligned) with end surface **1**A of member **1**, either:

so that surface **3**A protrudes (longitudinally out from member **1**) slightly beyond surface **1**A; or

so that insert **3** is entirely within cavity **4**, with a bottom end portion of member **1** extending longitudinally slightly beyond surface **3**A.

Typically, the metal insert of the inventive fence post assembly is a metal pipe having an annular cross-section (in planes perpendicular to the insert's longitudinal axis), as is each of pipe **12** of FIG. **2**, insert **13** of FIG. **3**, and insert **3** of FIG. **4**. Alternatively, the metal insert has another shape (e.g., it is a solid, elongated, cylindrical rod, or another solid elongated item, or an elongated item shaped so that its cross-section in planes perpendicular to its insert longitudinal axis is non-annular).

Typically, the metal insert of the inventive fence post assembly is longitudinally shorter than the wood post member of the assembly (e.g., as insert **13** of FIG. **3** is longitudinally shorter than member **11**, and insert **3** of FIG. **4** is longitudinally shorter than member **1**), so that the metal insert does not extend into an end portion of the fence post assembly. For example, metal insert **13** of FIG. **3** does not extend into the upper end portion of member **11** including second end surface **11**B (i.e., the distance P between first and second end surfaces **13**A and **13**B of insert **13** is less than the distance L between first and second end surfaces **11**A and **11**B of member **11**), and metal insert **3** does not extend into the upper end portion of member **1** including second end surface **1**B. This feature desirably allows the end portion of the fence post assembly (into which the metal insert does not extend) to be oriented as the upper end of the assembly during installation (e.g., as is the installed fence post assembly shown in FIG. **5**), and to be conveniently trimmed off (or otherwise processed), e.g., during or after installation of the fence post assembly, without the need to cut through the metal insert.

In typical embodiments, the overall length (along the longitudinal axis) of the wood post member of the inventive fence post assembly, and thus the overall length (along the longitudinal axis of the wood post member) of the post assembly, is equal to L, where L is greater than (or at least substantially equal to) 5 feet, and the length (along the insert longitudinal axis) of the metal insert of the assembly is equal to P, where P is in the range (0.60) L≤P≤(0.99) L. Preferably, L is at least substantially equal to 8 feet, and (0.60) L≤P≤(0.75) L. For example, in one such embodiment, L=8 feet, and P=5 feet=(0.625) L. For another example, in another such embodiment, L=8 feet, and P=5.5 feet=(0.687) L.

In preferred embodiments, the wood post member of the inventive fence post assembly has a square or round perimeter (in a plane perpendicular to its longitudinal axis). For example, member **11** of FIG. **3** has such a square perimeter (with the perimeter's sides having length S), and member **1** of FIG. **4** has such a round (circular) perimeter (with the circular perimeter having diameter D).

It is expected that, in typical embodiments, the wood post member of the inventive structure is about 8 feet long (e.g., L is about 8 feet in FIG. **3**, and L' is about 8 feet in FIG. **4**), with cross-section (in a plane perpendicular to its longitudinal axis) having an outer periphery which is a 3.5 inch square (e.g., S=3.5 inches in FIG. **3**) or a 4 or 6 inch circle (e.g., D=4 inches, or D=6 inches, in FIG. **4**). A typical method for manufacturing such a structure is as follows: a solid wood post is longitudinally drilled partially (e.g., 5 or 5.5 feet into its bottom end, when the overall length of the wood post is 8 feet or substantially equal to 8 feet) to produce a wood post member having a cavity cored into one end (the end intended to be the bottom end of the structure when it has been installed); and a metal member (pipe) having annular cross-section (e.g., 10 or 12 gauge pipe having outer diameter of about 1.25 inches, where 10 gauge pipe has 0.126-0.136 inch wall thickness, and 12 gauge pipe has 0.101-0.111 inch wall thickness) is pounded (rammed) into the cavity in the wood post member so as to be held therein by friction. Positioning the metal insert in only the lower portion (e.g., the lower 5 to 5.5 feet of an 8 foot post assembly) allows the top portion of the post assembly desirably to be exactly the same as the top portion of a conventional wooden post (so users can employ conventional fence assembly methods, which typically include trimming off the uppermost segment of the installed post above the top of a fence railing which has been attached to the installed post), while preventing loss of strength due to deterioration of the post (which mainly occurs at or near to ground level, due to chemical reaction of the wooden portion of the post assembly with dirt/water) after installation. The wood portion of the inventive assembly (or the wood portion of the inventive assembly above a concrete anchor, when the assembly has been anchored in concrete) is the portion most likely to have the fastest rate of deterioration (due to interaction with soil, water, and environmental factors). The metal insert of the inventive assembly maintains the assembly's strength despite rotting or other deterioration of the assembly's wood portion.

In some alternative embodiments, the metal insert of the inventive fence post assembly extends all (or almost all) the way longitudinally within the wood post member of the assembly.

In a class of embodiments, the invention is a method for manufacturing a fence post assembly, including steps of:

(a) removing wood from a first end of a wood piece (preferably an elongated, solid wood piece, e.g., solid wood post **10** of FIG. **1**) suitable for use as a wood fence post, and having a longitudinal axis, a first end surface, and a second end surface (e.g., the wood removal is performed by drilling into the first end surface of the wood piece), thereby producing a wood post member having a cavity defined therein, said wood post member having the longitudinal axis, a cored first end surface, and the second end surface. Preferably, this is the only step of removing wood from the solid wood piece or wood post member, so that preferably no additional cavity is formed therein; and

(b) ramming an elongated metal insert (e.g., annular metal pipe **12** of FIG. **1**), having an insert longitudinal axis, a first end surface, and a second end surface, into the cavity defined in the wood post member, such that the insert is positioned (and preferably, held by friction) within the wood post member with the first end surface of the metal insert at least substantially aligned with the cored first end surface of the wood post member, and the insert longitudinal axis at least substantially aligned with the longitudinal axis of the wood post member.

Typically, the method insert is an annular metal pipe. Also typically, the cavity is at least substantially cylindrical, and step (a) includes longitudinally drilling out an at least substantially cylindrical inner portion of the wood piece, thereby defining said cavity in the wood piece.

A method in the noted class of embodiments can be performed to produce the post assembly of FIG. **3** (also shown, installed in the earth, in FIG. **5**), with wood post

member **11** of FIG. **3** being produced by removing wood from post **10** of FIG. **1** (defining the cavity **14** in member **11**), and ramming metal insert **13** (which can be identical to pipe **12** of FIG. **2**, with it being understood that FIGS. **1-3** and **5** are not drawn to the same scale) into cavity **14** of member **11**. Cavity **14** is typically defined by longitudinally drilling out a cylindrical volume from a wood piece (e.g., wood post **10** of FIG. **1**), thereby producing wood member **11** having cavity **14**, with the cavity **14** being sized and shaped to receive an annular metal insert (e.g., insert **13**) such that (after the ramming step) the insert is retained in wood member **11** by friction between the outer cylindrical surface of the insert and the cylindrical side surface of cavity **14**.

Preferably, the elongated metal insert has a length (along the insert longitudinal axis) P, the wood post member has a length (along the longitudinal axis) L, and P≤L. More preferably, P is substantially less than L. In typical embodiments, the overall length (along the longitudinal axis) of the wood piece (and of the wood post member) and thus the overall length (along the longitudinal axis of the wood post member) of the fence post assembly is equal to L, and L is greater than (or at least substantially equal to) 5 feet, and the length, P, of the metal insert is in the range (0.60) L≤P≤(0.99) L. Preferably, L is at least substantially equal to 8 feet, and (0.60) L≤P≤(0.75) L. For example, in one such embodiment, L=8 feet, and P=5 feet=(0.625) L. For another example, in another such embodiment, L=8 feet, and P=5.5 feet=(0.687) L.

In a second class of embodiments, the invention is a method for manufacturing a fence post assembly, including steps of:

(a) providing an elongated metal insert (e.g., a metal pipe), having an annular cross-section, an insert longitudinal axis, a first end surface, a second end surface, and a length (along the insert longitudinal axis) P, and a wood post. Preferably, the wood post has a cross-section having a periphery which is a square or a circle, and the elongated metal insert has an annular cross-section;

(b) removing (e.g., longitudinally drilling out, with a hydraulic drill) an at least substantially cylindrical inner portion of the wood post, thereby defining a cavity in the wood post and producing a cored wood post member having the cavity, where the cored wood post member has a longitudinal axis, a first end surface, and a second end surface, a length (along the longitudinal axis) L, and said cavity is of size and shape to receive at least a major portion of the metal insert (where said at least a major portion of the metal insert may be all or substantially all of the metal insert). Preferably, the cavity has a length which is at least substantially equal to P. Also preferably, step (b) is the only step of removing wood from the solid wood post or cored wood post member, so that preferably no additional cavity is formed therein;

(c) inserting (e.g., by ramming, using a hydraulic ram) the metal insert into the cavity of the cored wood post member, such that the metal insert is positioned relative to the cored wood post member with at least a major portion of the metal insert (e.g., the entire metal insert) within the cored wood post member, and with the first end surface of the metal insert at least substantially aligned with the first end surface of the cored wood post member, and the insert longitudinal axis at least substantially aligned with the longitudinal axis of the cored wood post member, thereby producing the fence post assembly.

In typical embodiments, P≤L, and preferably, P is substantially less than L. In typical embodiments, the overall length (along the longitudinal axis) of the wood post (and of the cored wood post member) and thus the overall length (along the longitudinal axis of the wood post member) of the post assembly is equal to L, and L is greater than (or at least substantially equal to) 5 feet, and the length, P, of the metal insert is in the range (0.60) L≤P≤(0.99) L. Preferably, L is at least substantially equal to 8 feet, and (0.60) L≤P≤(0.75) L. For example, in one such embodiment, L=8 feet, and P=5 feet=(0.625) L. For another example, in another such embodiment, L=8 feet, and P=5.5 feet=(0.687) L.

A method in the second class of embodiments can be performed to produce the post assembly of FIG. **3** (also shown, installed in the earth, in FIG. **5**), with cored wood post member **11** of FIG. **3** being produced by removing wood from post **10** of FIG. **1** (defining the cylindrical cavity **14** in member **11**), and inserting annular metal insert **13** (which can be identical to pipe **12** of FIG. **2**, with it being understood that FIGS. **1-3** and **5** are not drawn to the same scale) into cavity **14** of member **11**. Cavity **14** is typically defined by longitudinally drilling out a cylindrical volume from a wood piece (e.g., wood post **10** of FIG. **1**), thereby producing wood member **11** having cylindrical cavity **14** having length at least substantially equal to P (the length of the insert), with the cavity **14** being sized and shaped to receive annular metal insert **13** such that (after the insertion step) the insert is retained in member **11** by friction between the outer cylindrical surface of the insert and the cylindrical side surface of cavity **14**. Preferably, step (b) is performed at a first station (a first location in a manufacturing facility); step (c) is performed at a second station (a second location in the manufacturing facility); and the method includes a step of: after step (b) and before step (c), conveying the cored wood post member to the second station. Step (c) is typically an automated ramming (pounding) step, e.g., performed using a hydraulic ram.

Benefits of typical embodiments of the inventive fence post assembly include all or some of the following:

the fence post assembly is structured so as not to be subject to unacceptable loss of strength (and/or unacceptable warping) due to deterioration (e.g., rotting) after installation, and/or to have a substantially longer expected useful life than does an installed conventional (i.e., solid) wood fence post before becoming subject to unacceptable strength loss and/or unacceptable warping due to deterioration. Thus, the inventive fence post assembly typically do not need to be replaced or repaired after installation, and/or have a substantially longer useful life than a typical installed conventional wood fence post;

the fence post assembly is a pre-assembled structure (not requiring assembly by the user during or before installation) which is ready for easy installation by the user. Thus, a typical embodiment of the inventive fence post assembly is pre-assembled and ready for installation in the same manner as conventionally employed to install a conventional (purely wooden) wood post;

the fence post assembly has a simple structure and is inexpensive (relative to more complex fence post structures and/or fence post structures including more expensive materials); and

the fence post assembly is easily installable and usable, e.g., using conventional methods for installing a conventional (purely wooden) fence post, and conventional methods for constructing a fence which includes a conventionally installed wooden fence post, without the need for extra parts (e.g., brackets) as are required for installation of some conventional fence post assemblies which include metal and/or plastic components.

Another aspect of the invention is a method for installing any embodiment of the inventive fence post assembly in the earth (where "earth" is used in this context in a broad sense to denote any supporting material, typically, but not necessarily, consisting essentially or primarily of dirt). For example, in a class of embodiments, the inventive method is a method for installing a fence post assembly, where the fence post assembly includes a wood post member (having a longitudinal axis, a first end surface, and a second end surface) and an elongated metal insert (having an insert longitudinal axis, a first end surface, and a second end surface), where the metal insert is positioned within the wood post member, with the first end surface of the metal insert at least substantially aligned with the first end surface of the wood post member, and the insert longitudinal axis at least substantially aligned with the longitudinal axis of the wood post member, said method including steps of:

(a) digging into earth to define a hole therein (when the fence post assembly has overall length at least substantially equal to 8 feet, step (a) is typically performed so that the hole has a depth in a range from about 1.5 ft to about 2.5 ft, or more preferably, from about 2 ft to about 2.5 ft);

(b) placing wet concrete into the hole; and

(c) inserting a lowermost segment of a fence post assembly, including the first end surface of the metal insert, into the wet concrete.

Typically, step (c) includes a step of, after inserting the lowermost segment of the fence post assembly into the wet concrete, allowing the concrete to dry, or to dry and cure.

Typically the method also includes steps of:

(d) after step (c), attaching (e.g., nailing, or otherwise conventionally attaching) railing to an exposed wood portion of the fence post assembly above the earth; and

(e) after step (d), cutting off (trimming) an uppermost segment of the fence post assembly above the railing.

In some such embodiments, the overall length of the fence post assembly is at least substantially equal to 8 feet, step (c) encases the lowermost segment (preferably having length in a range from about 2 feet to about 2.5 feet) of the fence post assembly in concrete, step (d) is performed to attach the fence railing to a middle segment of the fence extending from about 5 feet to about 6 feet above the concrete, and step (e) is performed to cut off a top segment of the fence post assembly having length less than or equal to about 12 inches. Preferably, the metal insert of the fence post assembly extends within most of the length of the post assembly but does not extend as far as the top segment, so that the top segment (which is cut off in step (e)) consists of wood, and the metal insert does not interfere with the trimming of the top segment.

A typical embodiment of the noted installation method can be performed to produce the installed fence post structure shown in FIG. **5**. In FIG. **5**, the fence post assembly including wood fence post member **11** and metal insert **13** positioned within member **11**, is shown installed in concrete anchor **15** in earth **17**. To install this fence post assembly, a hole is dug into the earth **17**, and wet concrete is placed into the hole. Then, the lowermost segment of the fence post assembly is inserted into the wet concrete. The wet concrete is then allowed to dry and cure, forming concrete anchor **15** which anchors the fence post assembly (including a lowermost segment of metal insert **13**) in the earth **17**. After the fence post assembly is anchored into the earth **17**, fence railing **18** can be attached (e.g., by nailing it) to exposed wood portion E of the fence post assembly above the earth **17**. Then, the uppermost segment of the fence post assembly (above portion E, and thus above the attached railing **18**) can be trimmed off. Fence railing (e.g., railing **18**) can be attached in a conventional manner (e.g., by nailing) to typical embodiments of the inventive fence post assembly, even in a segment of the assembly which includes the metal insert, since there is typically sufficient wood around the metal insert to allow such attachment of the railing. Alternatively, fence railing may be attached in a conventional manner (e.g., by nailing) to some typical embodiments of the inventive fence post assembly, in an upper segment of the assembly (e.g., the segment, of the FIG. **5** fence post assembly, above portion E) which does not include the metal insert (in this case too, an uppermost segment of the fence post assembly, above the attached railing, can be trimmed off).

When the inventive fence post assembly has been installed, the wood of the assembly above the concrete is the portion of the assembly likely to have the highest rate of deterioration (due to interaction with soil, water, and environmental factors). The metal portion of the post assembly is provided to maintain the post assembly's strength despite wood deterioration.

Typical types of wood for the wood portion of the inventive fence post assembly include (but are not limited to): Douglas fir, redwood, or cedar. Typically, the wood of the inventive fence post assembly is pressure-treated before installation of the assembly (e.g., before manufacture or installation of the assembly) by injecting into it creosote or another substance (e.g., in any conventional manner), to reduce its likely rate of deterioration.

Typical types of metal for the metal insert of inventive post assembly include (but are not limited to): steel (this is expected to be the best material for many applications, due to its low cost and adequate durability), galvanized steel, or other galvanized metal, aluminum, stainless steel.

The foregoing is merely illustrative and explanatory of preferred embodiments. Various changes in the component sizes and shapes, and other details of the embodiments described herein may be within the scope of the appended claims.

What is claimed is:

1. A fence post assembly, including:

a wood post member, having a longitudinal axis, a first end surface, and a second end surface; and

an elongated metal insert, having an insert longitudinal axis, a first end surface, and a second end surface, wherein the metal insert is positioned within a cavity in the wood post member, with the first end surface of the metal insert at least substantially aligned with the first end surface of the wood post member, and the insert longitudinal axis at least substantially aligned with the longitudinal axis of the wood post member;

wherein the metal insert is held within the cavity by friction; and

wherein the wood post member has a length L, along the longitudinal axis, and the elongated metal insert has a length P, along the insert longitudinal axis, and wherein L is greater than, or at least substantially equal to, 5 feet, and P is in the range (0.60) L<P<(0.99) L.

2. The assembly of claim **1**, wherein the metal insert is a metal pipe having an annular cross-section, in planes perpendicular to the insert longitudinal axis.

3. The assembly of claim **1**, wherein the metal insert does not extend into an end portion of the fence post assembly, said end portion of the fence post assembly including the second end surface of the wood post member.

4. The assembly of claim **1**, wherein L is at least substantially equal to 8 feet, and (0.60) L<P<(0.75) L.

5. A method for manufacturing a fence post assembly, including steps of:

(a) removing wood from a first end of a solid wood piece having a longitudinal axis, a first end surface, and a second end surface, thereby producing a wood post member having a cavity defined therein, said wood post member having the longitudinal axis, a cored first end surface, and the second end surface; and

(b) ramming an elongated metal insert, having an insert longitudinal axis, a first end surface, and a second end surface, into the cavity defined in the wood post member, such that the insert is held by friction within the wood post member with the first end surface of the metal insert at least substantially aligned with the cored first end surface of the wood post member, and the insert longitudinal axis at least substantially aligned with the longitudinal axis of the wood post member;

wherein the wood post member has a length L, along the longitudinal axis, and the elongated metal insert has a length P, along the insert longitudinal axis, and wherein L is greater than, or at least substantially equal to, 5 feet, and P is in the range (0.60) L<P<(0.99) L.

6. The method of claim 5, wherein said method includes no step, other than step (a), of removing wood from the solid wood piece or the wood post member, so that said method includes no step of forming an additional cavity in said solid wood piece or said wood post member.

7. The method of claim 5, wherein step (b) is performed such that the metal insert does not extend into an end portion of the fence post assembly, said end portion of the fence post assembly including the second end surface of the wood post member.

8. The method of claim 6, wherein L is at least substantially equal to 8 feet, and (0.60) L<P<(0.75) L.

9. The method of claim 5, wherein the elongated metal insert is a metal pipe having an annular cross-section.

10. The method of claim 5, wherein the cavity is at least substantially cylindrical, and step (a) includes longitudinally drilling out an at least substantially cylindrical inner portion of the wood piece, thereby defining said cavity in the wood piece.

11. A method for manufacturing a fence post assembly, including steps of:

(a) providing an elongated metal insert and a wood post, where the metal insert has an annular cross-section, an insert longitudinal axis, a first end surface, a second end surface, and a length P, along the insert longitudinal axis;

(b) removing an at least substantially cylindrical inner portion of the wood post, thereby defining a cavity in the wood post and producing a cored wood post member having the cavity, where the cored wood post member has a longitudinal axis, a length L, along the longitudinal axis, a first end surface, and a second end surface, and said cavity is of size and shape to receive at least a major portion of the metal insert; and

(c) inserting the metal insert into the cavity of the cored wood post member, such that the metal insert is positioned relative to the cored wood post member with at least a major portion of the metal insert within the cored wood post member, and with the first end surface of the metal insert at least substantially aligned with the first end surface of the cored wood post member, and the insert longitudinal axis at least substantially aligned with the longitudinal axis of the cored wood post member, thereby producing the fence post assembly;

wherein the metal insert is held within the cavity by friction; and

wherein the wood post member has a length L, along the longitudinal axis, and the elongated metal insert has a length P, along the insert longitudinal axis, and wherein L is greater than, or at least substantially equal to, 5 feet, and P is in the range (0.60) L<P<(0.99) L.

12. The method of claim 11, wherein step (b) is performed at a first station, step (c) is performed at a second station, and said method includes a step of:

after step (b) and before step (c), conveying the cored wood post member to the second station.

13. The method of claim 11, wherein step (c) is an automated ramming step.

14. The method of claim 11, wherein step (c) is performed such that the metal insert does not extend into an end portion of the fence post assembly, said end portion of the fence post assembly including the second end surface of the cored wood post member.

15. The method of claim 13, wherein L is at least substantially equal to 8 feet, and (0.60) L<P<(0.75) L.

16. A method for installing a fence post assembly, where the fence post assembly includes a wood post member and an elongated metal insert positioned within a cavity in the wood post member, the wood post member has a longitudinal axis, a first end surface, and a second end surface, and the metal insert has an insert longitudinal axis, a first end surface, and a second end surface,

wherein the metal insert is held within the cavity by friction; and

wherein the wood post member has a length L, along the longitudinal axis, and the elongated metal insert has a length P, along the insert longitudinal axis, and wherein L is greater than, or at least substantially equal to, 5 feet, and P is in the range (0.60) L<P<(0.99) L;

and where the first end surface of the metal insert is at least substantially aligned with the first end surface of the wood post member, and the insert longitudinal axis at least substantially aligned with the longitudinal axis of the wood post member, said method including steps of:

(a) digging into earth to define a hole therein;

(b) placing wet concrete into the hole; and

(c) inserting a lowermost segment of a fence post assembly, including the first end surface of the metal insert, into the wet concrete.

17. The method of claim 16, also including steps of:

(d) after step (c), attaching railing to an exposed wood portion of the fence post assembly above the earth; and

(e) after step (d), cutting off an uppermost segment of the fence post assembly above the railing.

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